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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
METZMAIER, DANIEL S	

ART UNIT	PAPER NUMBER
1796	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/569,221	GRAHAM, DAVID E.	
	Examiner	Art Unit	
	Daniel S. Metzmaier	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-30 and 33-35* is/are pending in the application.

4a) Of the above claim(s) *19,20,22,23,34 and 35* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-18,21,24-30 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/22/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 2-30 and 33-35 are pending.

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 2-30 and 33, drawn to a method of controlling the formation of crystalline hydrates.

Group II, claim(s) 34-35, drawn to a fluid mixture.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. The prior art cited in the search report and in the written opinion is evidence that the claimed inventions, considered as a whole, do not define a contribution over the prior art.

Election of species

2. This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

(a) a variety of polymers including dendritic in nature, hyperbranched polyamino polymers, or siliconized versions of these polymers and

(b) a solid material including silica, silica gels, diatomaceous earth, sand, cellulosics, polystyrene beads, and clay.

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

3. The claims are deemed to correspond to the species listed above in the following manner:

Claims 3-11 are directed to polymers and polymer properties.

Claims 12-30 are directed to polymers and solid particles including different solids and/or properties thereof.

The following claim(s) are generic: 2-30 and 33-35.

4. The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. The prior art cited in the search report and in the written opinion is evidence that the claimed inventions, considered as a whole, do not define a contribution over the prior art.

5. During a telephone conversation with Robert L. McKeller on 16 June 2009 a provisional election was made without traverse to prosecute the invention of group I, and species of hyperbranched polymers and silica solid, claims 2-3, 10-18, 24-30 and 33. Affirmation of this election must be made by applicant in replying to this Office action. Claims 4-9, 19-23 and 34-35 have been withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

7. Claims 19-20, 22-23 and 34-35 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention and species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 16 June 2009.

Information Disclosure Statement

8. It is noted for the record that the Information Disclosure form PTO-1449 (PTO/SB/08A) filed 22 February 2006 does not contains any citations.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 14 sets forth solid particulate. It is unclear what applicants intend by "the silica is filmed".

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 2-4, 10-13, 26, 28 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Shell Internationale Research Maatschappij BV, WO 01/77270 A1 (hereafter Shell).

Shell teaches a method for controlling gas hydrates in fluid systems comprising gas, oil and water (see abstract; page 1, lines 1 et seq; page 3, lines 30 et seq; page 5, lines 21 et seq; and examples). The method comprises adding a polymeric additive to the fluid systems and the additive may be functionalized dendrimeric polymers or functionalized hyperbranched polyesteramides (solid particle). The additive has a number average molecular weight of 670 to 50,000 (see page 7, lines 5-10) and exemplified number average molecular weight of 5890 (page 22, line 11). The chelating polymer would have been inherent to the functionalized hyperbranched polyesteramides due to the availability of free electrons from the nitrogen and oxygen atoms along the polymer chains.

The core of the hyperbranched polymer would be a hydrophobic solid associated with and embedded in the polymer. Applicants do not make a distinction between the polymer and solid polymer *per se*.

Accordingly, Shell teaching all the other limitations but the inherent properties of the polymers of the claims anticipates the claims.

13. Claims 2, 10-13, 21, 24, 27, 29-30 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Sloan (US 5,420,370). Sloan '370 teaches a method for controlling clathrate hydrates in fluid systems comprising gas, oil and water (see abstract; col. 3,

lines 36-46; col. 5, lines 1-38 and 50-60). The method comprises adding a polymeric additive to the fluid systems and the additive may be poly(N-vinyl-2-pyrrolidone) and/or hydroxyethylcellulose (solid particle). The additive has a molecular weight of greater than 3000 (see col. 4, lines 50-64). The chelating polymer would have been inherent to the poly(N-vinyl-2-pyrrolidone) and/or hydroxyethylcellulose due to the availability of free electrons from the nitrogen and oxygen atoms along the polymer chains.

Accordingly, Sloan '370 teaching all the other limitations but the inherent properties of the polymers of the claims anticipates the claims.

14. Claims 2, 10 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Sloan (US 5,639,925). Sloan '925 teaches a method for preventing hydrate masses in fluid systems such as natural gas and petroleum. The additives used to prevent the formation of the hydrates are polymeric and include such compounds as polyamides and poly-oxazolines (see abstract; col. 3, lines 20-37, 51-67; col. 4, lines 14-20, 23-41). The chelating polymer would have been inherent to the polyamides or poly-oxazolines polymers due to the availability of free electrons from the nitrogen and oxygen atoms along the polymer chains.

Accordingly, Sloan '925 teaching all the other limitations but the inherent properties of the polymers of the claims anticipates the claims.

15. Claims 2-3, 10 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Pakulski (US 6,331,508). Pakulski teaches a method for controlling the formation of gas hydrate crystals in fluid systems by admixing said fluid with a polyoxyalkylenediamino (see abstract; col. 2, lines 1-28; col. 3, lines 5-15; col. 4, lines

32-64). The chelating property of the polymer would have been inherent to the polyoxyalkylenediamino polyoxymers due to the availability of free electrons from the oxygen atoms along the polymer chains.

Accordingly, Pakulski teaching all the other limitations but the inherent properties of the polymers of the claims anticipates the claims.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 2-10, 13 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shell Internationale Research Maatschappij BV, WO 01/77270 A! (hereafter Shell), in view of DSM NV, WO 00/58388.

Shell teaches a method for controlling gas hydrates in fluid systems comprising gas, oil and water (see abstract; page 1, lines 1 et seq; page 3, lines 30 et seq; page 5, lines 21 et seq; and examples). The method comprises adding a polymeric additive to the fluid systems and the additive may be functionalized dendrimeric polymers or functionalized hyperbranched polyesteramides (solid particle).

Shell differs from claims 7-9 in the use of siliconized polymers.

Shell (page 5, lines 21 et seq; and page 7, lines 12 et seq) cites reference to WO 00/58388 for how to make hydrperbranched polymers and modification of the end groups of the hyperbranched polymers.

DSM (page 6, lines 10 et seq) disclose branched polymers. DSM (page 19, lines 2-5) discloses prefers no chain lengthening or cross-linking. Clearly, DSM suggest dendritic and hyperbreanching. DSM (page 17, lines 34 et seq) teaches the branched polymer is reacted with a diisocyanate after which the isocyanate polymer is further reacted with a isocyanate reactive compound as a modifier, such as (page 18 to 19, lines 32 to 1) aminopropyltri(m)ethoxysilane or aminoalkyltrialkoxysilane. DSM (page 16, line 18) teaches alkoxysilane reactive groups as modifiers. This teaching clearly results in siliconized branched polymers.

These references are combinable because they teach related polymers and Shell references DSM for how to make and provide functional groups on the polymers. It would have been obvious to one of ordinary skilled in the art at the time of applicants' invention to employ the siliconized modifiers for the dendritic and hyperbranched polymers of Shell as obviously contemplated and considered in the Shell reference by citation to the DSM reference.

Shell differs from claims 5 and 8-9 in the combination of polymers. It is generally *prima facie* obvious to use in combination two or more ingredients that have previously been used separately for the same purpose in order to form a third composition useful for that same purpose. *In re Kerkhoven*, 626 F.2d 846, 205 USPQ 1069 (CCPA 1980); *In re Pinten*, 459 F.2d 1053, 173 USPQ 801 (CCPA 1972); *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971); *In re Crockett*, 279 F.2d 274, 126 USPQ 186 (CCPA 1960). As stated in *Kerkhoven* and *Crockett*, the idea of combining them flows logically from their having been individually taught in the prior art. In the instant case, the use of

dendritic, hyperbranched and/or siliconized poylymers thereof are clearly contemplated as obvious functional equivalent polymers for contacting with fluids for the advantage of inhibiting gas hydrate formation.

18. Claims 2, 10-12, 14, 16-18, 24-25, 27-30 and 33 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hutchinson, US 2,293,901. Hutchinson (pages 1-2 and claims) discloses dehydrating hydrocarbon gases by the contact of said gases with a solid material having coated on the surface thereof (page 2, lines 33 et seq) including polymers of gelatin, starch and glycogen and Hutchinson (page 2, lines 15 et seq) further characterizes the protective polymer proteins and saccharide as adsorbent. The protective polymers would have been expected to have a MW of at least 5000 as originating natural polymers of much higher molecular weights. The chelating property of the polymer would have been inherent to the gelatin, starch and glycogen due to the availability of free electrons from the oxygen and nitrogen atoms along the polymer chains.

Hutchinson (page 1, lines 16 et seq) teaches the use of porous and activated forms of metal oxides including alumina, silica and iron oxide.

To the extent Hutchinson differs from the claims regarding a teaching of the claims in sufficient specificity, Hutchinson teaches the dehydration or removal of water from natural gas streams by contacting with a silica material coated with a natural polymer including gelatin, starch and glycogen. It is known conventionally that proteins inhibit gas hydrate formation. The gelatin, starch and glycogen coating on the silica would have been expected to have the chelating properties for the charged gas

molecules. The particular solid materials claimed would have been obvious since the only requirement of the Hutchinson reference is water adsorption of the combined particle and coating. Since all the solid particles existed and would have been expected to have been adsorbent of the hydrate forming materials, said materials would have been an obvious functional equivalent for the purpose of dehydrating as taught in the Hutchinson reference.

Allowable Subject Matter

19. Claims directed to applicants' method claim 33 incorporating claims 3, 11 and 13 would be deemed allowable as well as the elected species employing hyperbranched polymers (claim 3) with silica solid (claim 14) embedded therein (claim 13) would be deemed allowable since the prior art does not adequately disclose or suggest the combination immediately preceding, in this paragraph, in contacting a fluid stream for controlling gas hydrates as claimed without the use of impermissible hindsight.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (571) 272-1089. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David W. Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel S. Metzmaier/
Primary Examiner, Art Unit 1796

DSM